

CHIGNECTO SHIP RAILWAY, CANADA.

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1022

Between 1888 + 1891
C.H.C. [1890 ?]

Rec'd From

Mr. Bell Dawson

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CHIGNECTO SHIP RAILWAY, CANADA.

Between 1888 & 1891

[1890 ?]

1890
(55)

RIVER ST LAWRENCE

C. CASPE
Cape Bay
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COUNTY OF

BANGOR

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Meadow River Bay
Geldere's Bay
Franchmont's Bay

Pouchscot Bay
and River

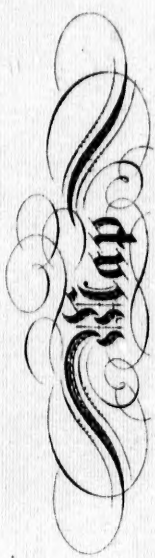
UNITED

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ISLANDS

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CHICNECTO SHIP RAILWAY





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CHIGNECTO SHIP RAILWAY,

CANADA.

BETWEEN the Gulf of St. Lawrence and the Bay of Fundy there is a narrow neck of land connecting the Province of Nova Scotia with the mainland of Canada, known as the Isthmus of Chignecto.

For upwards of 100 years the project of uniting these waters has been advocated by means of a canal, so as to enable vessels to pass direct from the St. Lawrence to St. John, New Brunswick, Portland, and Boston, instead of by the present dangerous and circuitous route around the Peninsula of Nova Scotia.

At repeated intervals the feasibility of cutting this canal was brought under consideration; various plans were prepared with that view, and various public surveys were made with the object of locating the course of the canal.

The proposed route was surveyed by engineers in the employment of the Government of Canada, New Brunswick, and Prince Edward's Island, and it was found that the

difficulties to be encountered in the construction of a canal, accessible at all times of the tide, would be attended with enormous expense, not only in its first construction, but afterwards, in repairs and maintenance.

It was a scheme beset with many difficulties; the Bay of Fundy (remarkable for the extraordinary range of its tides) was found to contain vast quantities of alluvial matter, which would quickly deposit and fill up the locks and waterway; and there was a difference in the tidal levels between the two bays of from 17 to 23 feet, and the necessity of providing locks to overcome the difference of level would also involve considerable delay in the passage of vessels.

After having engaged the attention of the various Provincial and Dominion Governments so many years, this scheme was finally abandoned, and a proposal by Mr. Ketchum (M. Inst. C.E.) for a ship railway for the conveyance of vessels with their cargoes bodily across the isthmus, was adopted as a substitute.

In 1882 (99 years after the idea of a canal had first been mooted) the Chignecto Marine Transport Railway Company was incorporated by special Act of Parliament of Canada, with a share capital of £400,000 and an authorised debenture capital of £700,000; and the Government (to quote the words of the Act) "in consideration of the great advantages which would accrue to the maritime provinces and the Intercolonial trade of Canada generally," granted to the Company a subsidy of \$170,000 (equal to about £35,000) a year for 20 years from the opening of the line.

A contract for the construction of the works was entered into with the eminent contractors, Messrs. John G. Meiggs and Son, of London.

Work was commenced in September, 1888, and has been ever since continuously carried on, under the superintendence of the Company's Engineers, Messrs. Sir John Fowler, Sir

Benjamin Baker, and Mr. Ketchum ; and it is expected that the whole undertaking will be completed in the autumn of 1891.

A basin for vessels is being constructed at the Bay of Fundy end, 500 feet long, 300 feet wide, with a gate 60 feet wide and 30 feet high, to enclose the water when the tide is out; at the inner end of this basin there is to be a lifting dock, 230 feet by 60 feet, of first-class masonry. The lifting dock will contain 20 hydraulic presses for lifting vessels with their cargoes a height of 40 feet. The vessel will be brought into the basin when the tide permits, and admitted to the dock. It will then be floated into position between the hydraulic presses and immediately over a (so-called) gridiron and cradle previously sunk to the bottom of the dock; when the vessel is in her proper place, the gridiron and cradle will be gently raised to the bottom of the vessel; the cradle will be furnished with blocks at distances of seven to eight feet apart, to support the hull, not only on the keel but also on the bilges. The gridiron, with the vessel and cradle, will then be raised by the hydraulic lifts until the rails supporting them are brought up to the level of the rails on the railway. The vessel and the cradle (which rests on wheels) will then be hauled off by an hydraulic apparatus to the railway track, the rails of which will coincide with those of the gridiron. The extreme weight proposed to be raised is 3,500 tons, including the gridiron, cradle, and a loaded vessel of 2,000 tons displacement, or 1,000 tons register.

The railway is to be a double track, 17 miles long, in a perfectly straight line, and on almost a dead level, the heaviest gradient being 1 in 500, and the rails (already on the spot) are of steel, 110 lbs. to the yard. The vessel will be carried on these rails by the same cradle which received her in the lifting dock ; it will be carried on a large number of wheels, so that the weight of the load will be well dis-

tributed, and each wheel will have to sustain but a small portion of the burden.

The vessel and cradle will be drawn by locomotives, one on each track, which are calculated to move the load with ease, at the rate of 10 miles an hour, the largest vessel required to be carried across.

After the vessel is transported to the other end of the railway, the locomotives will be shunted out of the way by a traversing shunt, and the vessel and cradle transported to another hydraulic lift. It will then only be necessary to lower the vessel to a sufficient depth, when it will be floated away. In the case of a steamer it will immediately steam away, or if a sailing vessel it may be towed out.

The raising, transport, and lowering of vessels will be effected in about two hours, more or less, according to size, and sufficient rolling stock and traversers will be provided upon the line so as to enable vessels to be forwarded at short intervals.

It has been the study of the world's greatest engineers to devise means whereby the highways of commerce can be shortened—in other words, to cheapen freight and quicken transit. The Suez Canal and the Mont Cenis Tunnel were only built when the interests of commerce demanded it, and the same may be said of this ship railway, which will probably revolutionise the coasting traffic of the maritime Provinces.

The commercial advantages of this undertaking are beyond doubt, and are fully recognised by the Canadian Government.

For a long time the idea of raising ships of large tonnage out of the water, and transporting them over land without injury to hull or cargo, was looked upon as hazardous, but all prejudices have now been overcome; the scheme is generally recognised as a combination of the marine slip

hydraulic lift and ordinary railway, all of which are constantly in operation, and there is nothing in the working of the ship railway which is not found in one or other of these contrivances.

The strength of a vessel lies in her keel and frame-work, and not in the support of the water by which she is surrounded. If she can safely carry freight over stormy seas, where half her hull is often out of water, pounded by the waves that break over her decks or drive upon her beams, tossing her from crest to crest, and dropping her suddenly into troughs of the sea, it is idle to say she cannot safely carry her burden when lifted gently into a specially made "cradle" and borne smoothly and steadily over solid steel rails.

Evidence has shown that public works of the character of this undertaking, when once established and proved to be safe and reliable, rapidly secure traffic; and a notable instance may be mentioned, viz.: the Suez Canal, the object of which is identical with this ship railway, *i.e.*, the shortening of distances. The number of vessels which availed themselves of that work during the first year of its existence was 486, with an aggregate tonnage of 435,911 tons; ten years later 1,592 vessels, with a total tonnage of 3,446,431 tons, and from that period (1880) to the present time the traffic has always been increasing. In 1884 the total number of vessels was 3,284, with the enormous tonnage of 8,319,967 tons. The financial results of that undertaking were proportionate to the traffic—the receipts for tolls the first year amounted to only £255,000, which increased to £2,577,608 in 1884, and the net profits are now some 17½ per cent. on the share capital of £8,000,000.

A glance at the map will show the advantages of the route of the Chignecto Railway over the sea passage in point of time and distance; not only will a saving of some three to seven hundred miles be effected, but lake-going vessels

(unfitted to encounter the waves of the Atlantic) will be enabled to continue their voyage to the United States.

There is sufficient shipping trade to be tapped in the locality to warrant expectations of traffic to a very large extent. There are two regular lines of steamers running from Prince Edward's Island to the mainland, connecting with railways to the United States, besides an American line running thence to Boston through the Straits of Canso.

The Canadian Blue Books give the following returns of shipping for the Provinces more immediately affected by the ship railway :—

ARRIVALS AND DEPARTURES OF VESSELS ENGAGED IN THE
COASTING TRADE.

Province.	Arrivals.		Departures.	
	No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.
Quebec -	8,691	2,647,017	8,576	2,671,380
Nova Scotia -	16,300	1,704,828	16,376	1,751,660
New Brunswick -	5,562	520,784	5,289	446,845
Prince Edward's I.	3,787	572,026	5,659	548,789
Total No -	34,346	5,444,655	33,900	5,418,674

Total arrivals and departures $\left\{ \begin{array}{l} 68,246 \text{ Vessels.} \\ 10,863,329 \text{ Tons.} \end{array} \right.$

When this enormous amount of traffic is considered, and when it is borne in mind that the use of this route will save in many instances 500 miles, it is not difficult to understand what would otherwise be thought the too sanguine expectations of the promoters of the undertaking.

It will only be necessary at first to tempt shippers by

fixing the tariff of charges at a comparatively low rate ; but if any stand off at first they will be compelled to adopt the route when they find the trade leaving their hands ; the rates of freight must inevitably be reduced by this short cut—in some instances two trips may be made where now only one is possible—business will be increased, and new trades spring up ; and while the shipping, fishing, mining, lumber, farming, and other interests will be benefited, and new produce brought to market, other indirect advantages will follow the successful accomplishment of this new isthmus transit ; and the result to the Company (as they well deserve), will no doubt be very profitable.

The Government, in granting the subsidy of £35,000 a year, have made it a condition that they shall only be called upon to pay sufficient to make up the net earnings to £77,000 (7 per cent. per annum on the authorised share and bond capital), and that in case they exceed this amount one-half of the surplus shall be paid to the Government until the whole of the subsidy, if any, found by them shall have been repaid.

The capital issued and taken up amounts to £650,000, viz., £300,000 in 7 per cent. preferential shares, £100,000 in ordinary shares, and £250,000 in 5 per cent. mortgage debenture bonds (part of an authorised issue of £700,000).

The subsidy of £35,000 will pay interest on the whole authorised issue of bonds for twenty years, leaving the traffic to provide a revenue to pay dividends on the share capital.

Before the Government are entitled to participate in the profits of the undertaking, £42,000 (equal to $10\frac{1}{2}$ per cent. on the share capital) must be paid to the shareholders, and to earn this amount it would require only a daily traffic of about three vessels of 1,000 tons each, for 200 days of navigation, as will be seen by the following calculation:—

3 vessels of 1,000 tons per diem, 200 days equal to 600,000 tons.

600,000 tons at 2s. average per ton	-	-	-	£60,000
600,000 tons of hulls at 6d.	-	-	-	15,000
				£75,000

Running expenses, as per estimate of Sir Benjamin

Baker, C.E.	-	-	-	-	-	30,000
						£45,000

A regular running line of steamers from St. John to Prince Edward's Island and to Quebec would alone supply this amount of traffic, regardless of any other vessels or steamers.

00,000

30,000

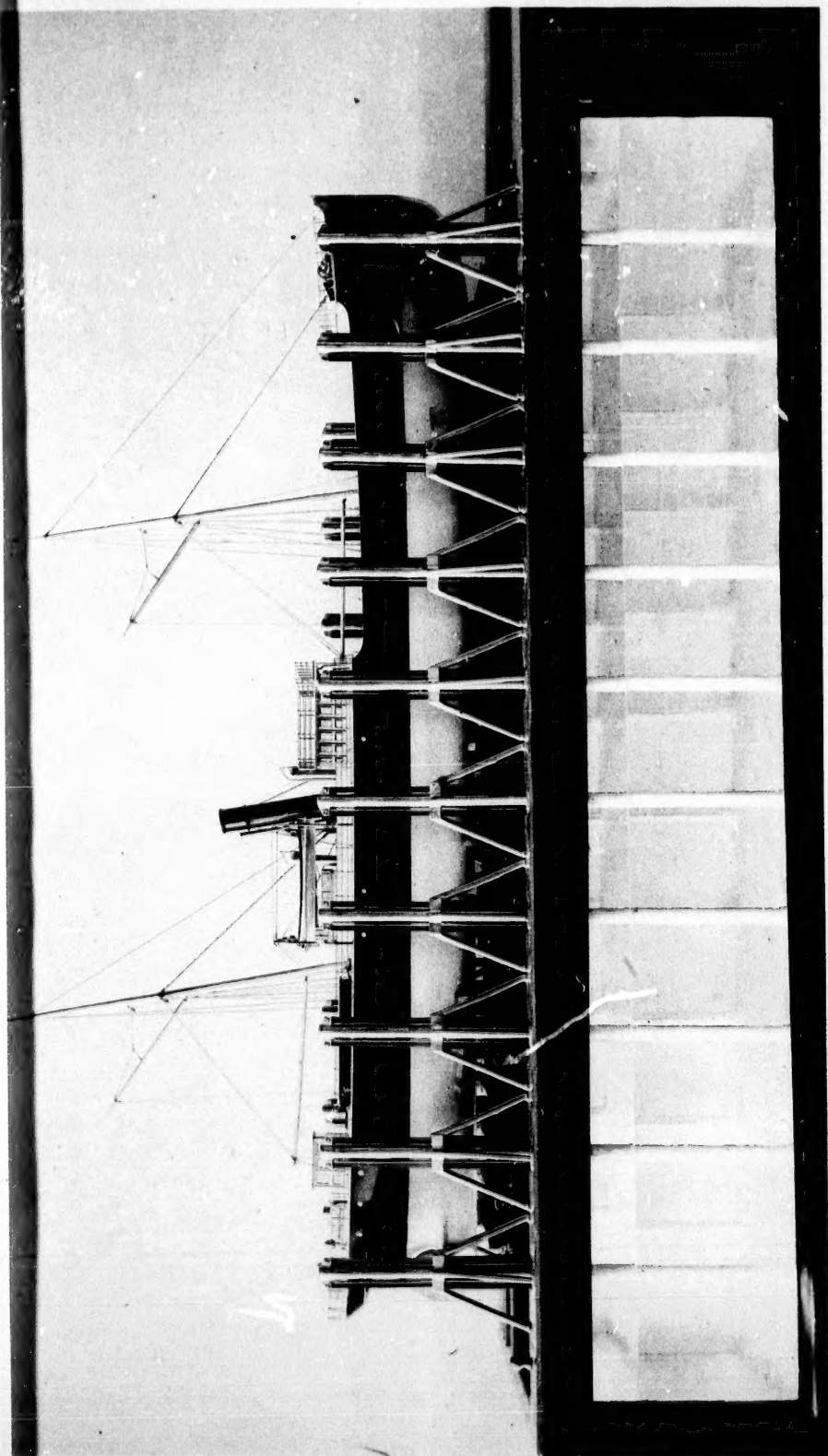
15,000

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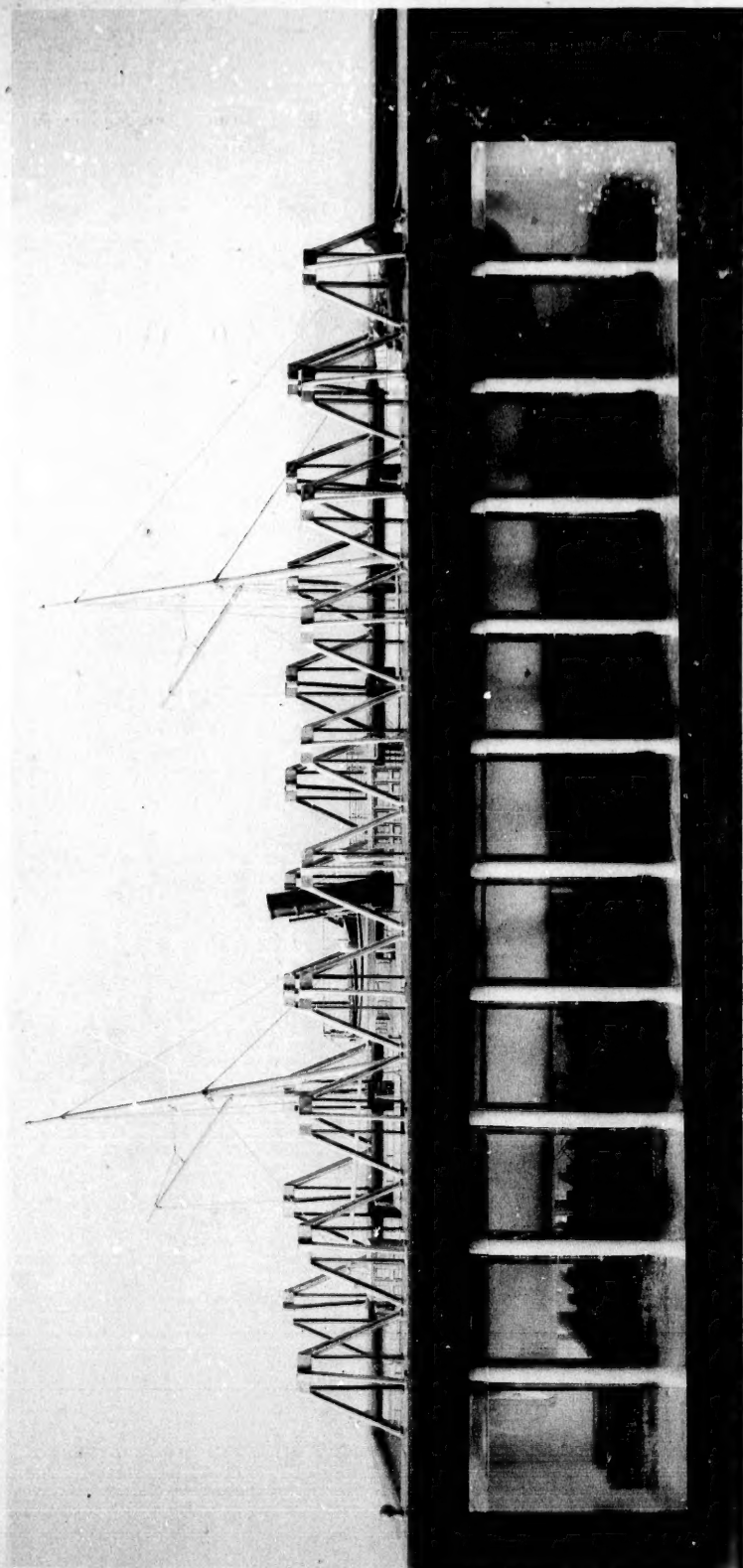
30,000

45,000

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sels or



VESSEL ON ITS CRADLE AND GRIDIRON, IN POSITION, READY TO BE LOWERED INTO THE WATER.



VESSEL FLOATING OVER THE CRADLE AND GRIDIRON, READY TO BE RAISED.